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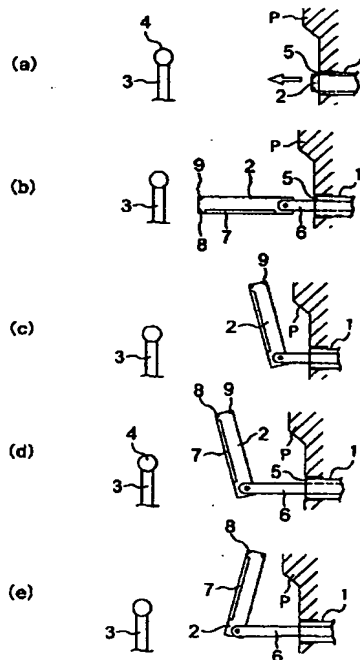
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(54) 【発明の名称】 車載用可動パネルの駆動制御装置

(57) 【要約】

【課題】 車種によりシフトレバーの位置や大きさあるいは前面パネル装置の形状等が異なったとしても、可動パネルが前進動作時や起立動作時にシフトレバーや前面パネル装置等と干渉するのを防止できる汎用性の高い車載用可動パネルの駆動制御装置を提供すること。

【解決手段】 表示画面7を有する液晶モニタ等の可動パネル2に、前進方向の障害物の有無を検出する第1の検出手段8と、起立方向の障害物の有無を検出する第2の検出手段9とを設け、第1の検出手段8が所定の検出信号を出力すると可動パネル2の前進動作が中断されて起立動作に移行し、かつ、第2の検出手段9が所定の検出信号を出力すると可動パネル2の起立動作が中断されて前進動作に移行するように構成する。



## 【特許請求の範囲】

【請求項1】 少なくとも表示画面を有する前面パネルと、この可動パネルが没入可能な収納口を有する筐体と、前記可動パネルを駆動する駆動制御機構とを備え、前記可動パネルを前記収納口から前進させると共に起立させることにより、前記表示画面を前記筐体の前面側に露出せしめる車載用可動パネルの駆動制御装置において、前記可動パネルにおける前進方向の障害物の有無を検出する第1の検出手段と起立方向の障害物の有無を検出する第2の検出手段とを設け、前記第1の検出手段が所定の検出信号を出力すると前記可動パネルの前進動作が中断されて起立動作に移行し、かつ、前記第2の検出手段が所定の検出信号を出力すると前記可動パネルの起立動作が中断されて前進動作に移行するようにしたことを特徴とする車載用可動パネルの駆動制御装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、表示画面を有する可動パネルが筐体に対して出没自在で前面パネル装置（インパネ）に取り付けられる車載用電子機器に係り、特に、可動パネルの前進動作や起立動作を制御可能な車載用可動パネルの駆動制御装置に関する。

## 【0002】

【従来の技術】近年、液晶モニタを備えた車載用電子機器の普及が目覚ましいが、モニタ装置を車室内の前部に常時設置すると、前方の視界を狭めたり運転操作の邪魔になりやすいという難点がある。また、前面パネル装置の一部にモニタ用の表示画面を組み込んだ場合には、各種操作キーを配設するスペースを確保するために表示画面が大きくできないという難点がある。

【0003】そこで最近、車載用AV機器などにおいて、液晶モニタを前面パネル装置に対して出没自在な可動パネル方式としたものが普及しつつある。このような可動パネル方式を採用すると、搭乗者がモニタ画面（表示画面）を見ないときには前面パネル装置の収納口内へ可動パネルを水平な姿勢で収納しておけるので、各種操作キーが配設される前面パネル装置に対する可動パネルの占有面積はさほど大きくならず、また、モニタ画面を見たいときには、前面パネル装置の収納口から可動パネルを前進させて所定量起立させることにより、搭乗者が見やすい場所に可動パネルを配置させることができる。なお、かかる可動パネル方式を採用した従来技術としては、特開平7-9920号公報記載のものが挙げられる。

## 【0004】

【発明が解決しようとする課題】ところで、液晶モニタ等の可動パネルは通常、前面パネル装置と運転席横のシフトレバーとの間に斜め上向きに起立した姿勢で配置されることが多いので、可動パネルを前面パネル装置の収

納口から前進させたり、前進後に起立させる際には、シフトレバーに当接しないように配慮して可動パネルを駆動制御する必要がある。特に、車載用の液晶モニタの表示画面が大型化しつつある昨今は、可動パネル方式の液晶モニタをシフトレバーに当接しない位置まで前進させてから起立させただけでは、斜め上向きの見やすい起立姿勢に至らせることが困難になってきている。そのため、大面積の可動パネルであってもシフトレバーと干渉を起こさずに前進動作や起立動作が行えるような工夫が要求されており、例えば、従来技術として挙げた上記特開平7-9920号公報記載のものは、可動パネルを前進させながら徐々に起立させていくという手法を採用している。

【0005】しかしながら、自動車のシフトレバーの位置や大きさは車種によって異なり、また、最近は前面パネル装置の一部を座席側へ突出させたデザインが広まっており、この突出部分が起立動作中の可動パネルと干渉を起こす恐れもあるので、可動パネルの前進動作や起立動作が一義的に決定されていると、かかる可動パネルを適用可能な車種が不所望に制限されてしまうという問題があった。

【0006】本発明はこのような従来技術の課題に鑑みてなされたもので、その目的は、車種によりシフトレバーの位置や大きさあるいは前面パネル装置の形状等が異なったとしても、可動パネルが前進動作時や起立動作時にシフトレバーや前面パネル装置等と干渉するのを防止できる汎用性の高い車載用可動パネルの駆動制御装置を提供することにある。

## 【0007】

【課題を解決するための手段】本発明は、可動パネルに前進方向の障害物の有無を検出する第1の検出手段と起立方向の障害物の有無を検出する第2の検出手段とを設け、第1の検出手段が所定の検出信号を出力すると可動パネルの前進動作を中断して起立動作に移行させ、かつ、第2の検出手段が所定の検出信号を出力すると可動パネルの起立動作を中断して前進動作に移行させることとする。このように可動パネルに複数回の前進動作と複数回の起立動作を交互に行わせると、シフトレバーの位置や大きさあるいは前面パネル装置の形状等が車種により異なった場合でも、これらに干渉されない経路で可動パネルを前進・起立させ、この可動パネルを表示画面が見やすい所望の起立姿勢に配置させることができる。

## 【0008】

【発明の実施の形態】本発明による車載用可動パネルの駆動制御装置では、少なくとも表示画面を有する前面パネルと、この可動パネルが没入可能な収納口を有する筐体と、前記可動パネルを駆動する駆動制御機構とを備え、前記可動パネルを前記収納口から前進させると共に起立させることにより、前記表示画面を前記筐体の前面側に露出せしめる車載用可動パネルの駆動制御装置にお

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いて、前記可動パネルにおける前進方向の障害物の有無を検出する第1の検出手段と起立方向の障害物の有無を検出する第2の検出手段とを設け、前記第1の検出手段が所定の検出信号を出力すると前記可動パネルの前進動作が中断されて起立動作に移行し、かつ、前記第2の検出手段が所定の検出信号を出力すると前記可動パネルの起立動作が中断されて前進動作に移行するようにした。

【0009】このような構成の駆動制御装置においては、筐体の収納口から前進させた可動パネルの第1の検出手段が、予め設定されている前進位置の手前でシフトレバー等の障害物を検知すると、前進動作を中断して起立動作に移行するので、該障害物との干渉が回避できる。また、起立動作中に可動パネルの第2の検出手段が前面パネル装置の突出部分等の障害物を検知すると、起立動作を中断して前進動作に移行するので、該障害物との干渉が回避できる。それゆえ、こうして複数回の前進動作と複数回の起立動作を交互に行わせることにより、シフトレバーの位置や大きさ、あるいは前面パネル装置の形状等が車種により異なっても、これらに干渉されない経路で可動パネルを前進・起立させて、この可動パネルを表示画面が見やすい所望の起立姿勢に配置させることができる。また、同様の理由で、表示画面が大型化した場合にも、シフトレバーや前面パネル装置等に干渉されない経路で可動パネルを前進・起立させやすくなる。

【0010】

【実施例】実施例について図面を参照して説明すると、図1は本発明の実施例に係る可動パネルの前進・起立動作を模式的に示す説明図、図2は該可動パネルを駆動制御する駆動制御装置の概略構成を示すブロック図、図3は該可動パネルを前進・起立させる動作手順を示すフローチャート、図4は該可動パネルの前進動作中断後の動作手順を示すフローチャートである。

【0011】図1において、符号Pは車室内の前面部分で音響機器等が取り付けられ、インパネとも略称される前面パネル装置、1はこの前面パネル装置Pに装着される筐体、2はこの筐体1に対して出沒自在な液晶モニタ等の平面ディスプレイで構成される可動パネル、3は運転席横に設置されたシフトレバー、4はそのシフトノブである。筐体1には可動パネル2を水平な姿勢で収納可能な収納口5が設けられており、スライダ6等のスライド移動駆動手段によって可動パネル2を前後進させることにより、収納口5から可動パネル2を排出させたり、逆に可動パネル2を収納口5内へ没入させることができる。なお、図示はしていないが、筐体1には可動パネル2を起立させたり傾倒させることのできる回転移動駆動手段の駆動部が組み込まれている。また、可動パネル2の表示画面（モニタ画面）7は、車載用としてはやや大型な例えば7インチの画面となっている。この可動パネル2の頭部には、シフトレバー3等の前方障害物を検出するためのシフトレバー検出手段8と、前面パネル装置

1等の起立方向の障害物を検出するためのインパネ検出手段9とが設けられており、これらの検出手段8、9は例えば超音波や赤外線等の反射を利用したセンサによって構成されている。

【0012】可動パネル2の前進動作や起立動作は、図2のブロック図に示すような構成の駆動制御装置によって制御される。すなわち、この駆動制御装置には、上述したシフトレバー検出手段8およびインパネ検出手段9と、可動パネル2の排出や収納を指令する入力釦である操作釦（OPEN/CLOSE釦）10と、可動パネル2を前後進させるスライド移動駆動手段11と、可動パネル2の前進位置を検出するスライド移動量検出手段12と、可動パネル2を回転（起立や傾倒）させる回転移動駆動手段13と、可動パネル2の回転角度（起立角度）を検出する回転角度検出手段14と、各種検出信号や指令信号が入力される共に、これらの信号に基づいて駆動手段11、13に制御信号を出力する制御手段15と、可動パネル2の前進位置や角度位置に関する情報等を記憶している記憶手段16とが具備されている。

【0013】次に、収納状態の可動パネル2を前進・起立させて表示画面7を所望の姿勢に配置させるまでの動作手順を、図3、4のフローチャートに沿って説明する。いま、操作釦10が押圧操作されて可動パネル2の排出を指令するOPEN制御信号が制御手段15から出力されると、収納口5内に水平な姿勢で収納されていた可動パネル2は、スライド移動駆動手段11により駆動され、図1(a)に示すようにシフトレバー3に向かって前進動作を開始する。ただし、前進動作を開始する前にまずステップS1において、可動パネル2のスライド位置データおよび角度位置データを調べ、次いでステップS2において、スライド位置データが予め記憶手段16にメモリされている値（最終前進位置）かどうかを調べ、もしもステップS2でYESならばステップS9へと進み、角度位置データが予め記憶手段16にメモリされている値（最終起立位置）かどうかを調べ、もしもステップS9でYESならば動作を終了させる。

【0014】可動パネル2が収納状態のときにはステップS2でNOとなるので、ステップS3へと進み、可動パネル2を前進させるべくモータが正転動作を開始する。そして、ステップS4で、動作開始後に許容される規定時間が経過しているか否かを調べた後、ステップS5で、スライド動作中の速さが最低基準値以上かどうかを調べ、問題がなければステップS6へと進む。ただし、ステップS4で動作開始後に所定の時間を経過していると判定されたときや、ステップS5でスライド動作中の速さが遅すぎると判定されたときは、ステップS2へと進み、何らかの障害により正常な動作が行えなくなっているものと判定して可動パネル2の駆動制御をすべて停止する。なお、ステップS5においてスライド動作中の速さが最低基準値以上かどうかを調べる方法とし

ては、例えばリニアポジションセンサを使用して500msで10mm(電圧値0.2V)以上移動するように設定しておき、電圧値が0.2V以上であれば正常、0.2V未満であればエラーとすることにより行え、これによりスライド動作が途中で阻害されているか否かを判定することができる。

【0015】ステップS6では、シフトレバー検出手段8がシフトレバー3等の前方障害物を検出したかどうかを調べ、前方に障害物がなければステップS7へと進み、可動パネル2の前進位置が予めメモリされている最終前進位置かどうかを調べる。ステップS7において、まだ最終前進位置へ到達していないと判定されればステップS3へ戻って同様の手順を繰り返し、もしも最終前進位置へ到達しているという判定がなされたならばステップS8へと進み、スライド移動駆動手段11による可動パネル2の前進駆動を停止させた後にステップS9へと進む。ただし、本実施例の場合は、シフトレバー3と表示画面7の位置関係により、可動パネル2を収納口5から最終前進位置まで一気に前進させることはできず、図1(b)に示すようにシフトレバー検出手段8がシフトレバー3を障害物とみなす位置まで可動パネル2が前進した時点で、ステップS6の判定がYESとなって図4に示すステップS16へと進む。

【0016】図4のフローチャートでは、まずステップS16でスライド移動駆動手段11による可動パネル2の前進駆動を停止(前進動作を中断)させた後、ステップS17で回転移動駆動手段13により可動パネル2を起立方向へ回転させ、次いでステップS18において、インパネ検出手段9が前面パネル装置P等の起立方向障害物を検出したかどうかを調べ、起立方向に障害物がなければステップS19へと進み、可動パネル2の角度位置が予めメモリされている最終起立位置かどうかを調べる。ステップS19において、まだ最終起立位置へ到達していないと判定されればステップS17へ戻って同様の手順を繰り返し、もしも最終起立位置へ到達しているという判定がなされたならば、ステップS20へ進んで回転移動駆動手段13による可動パネル2の起立駆動を停止させた後、ステップS21へ進んで前方に障害物のないことを確認したうえで、図3に示すステップS2へ戻って可動パネル2を最終前進位置まで前進させて動作を終了させる。

【0017】一方、図1(c)に示すように、可動パネル2が最終起立位置に到達する前にインパネ検出手段9が前面パネル装置1を障害物とみなした場合は、ステップS18の判定がYESとなるのでステップS20へと進み、可動パネル2の起立駆動を中断させた後、ステップS21へ進んで前方に障害物のないことを確認したうえで、図3に示すステップS2へ戻って前進動作を再開させ、図1(d)に示すように可動パネル2を最終前進位置まで前進させる。ただし、こうして再開させた前進

動作の途中でシフトレバー検出手段8が前方の障害物を検出することもありうるが、その場合はステップS6から再びステップS16へ進んで可動パネル2を起立させることになり、この2回目の起立動作で最終起立位置まで起立させることができればステップS21を経てステップS2へと進み、可動パネル2を最終前進位置まで前進させて動作を終了させる。また、この2回目の起立動作の途中でインパネ検出手段9が再び前面パネル装置Pを障害物とみなした場合は、上述したように可動パネル2の起立駆動を中断させた後、ステップS21を経てステップS2へと進み、可動パネル2を最終前進位置まで前進させた段階でステップS9へと進む。なお、ステップS21の判定がYESの場合は、可動パネル2が最終前進位置まで到達していないにも拘らず、前方に障害物があって前進できないことになるので、何らかの障害により正常な動作が行えなくなっているものと判定して、可動パネル2の駆動制御をすべて停止する。

【0018】さて、図1(d)に示すように、可動パネル2が最終起立位置までは到達していないが最終前進位置までは前進してステップS9へ進んだ場合は、そこでその判定がNOとなるのでステップS10へと進み、可動パネル2を起立させるべくモータが正転動作を開始する。そして、ステップS11で動作開始後に許容される規定時間が経過しているかどうかを調べた後、ステップS12で起立動作中の速さが最低基準値以上かどうかを調べ、問題がなければステップS13へと進む。なお、ステップS12において起立動作中の速さが最低基準値以上かどうかを調べる方法は、リニアポジションセンサ等を使用してスライド動作の速さの適否を調べるという前述したステップS5における方法と同様でよい。こうしてステップS12からステップS13へ進むと、インパネ検出手段9が前面パネル装置P等の起立方向の障害物を検出したかどうかを調べ、起立方向に障害物がなければステップS14へと進み、可動パネル2の角度位置が予めメモリされている最終起立位置かどうかを調べる。ステップS14において、まだ可動パネル2が最終起立位置へ到達していないと判定されれば、ステップS10へ戻って同様の手順を繰り返すことになる。そして、図1(e)に示すように、起立駆動によって可動パネル2が最終起立位置へ到達した場合は、ステップS14での判定がYESとなるので、ステップS15へと進み、回転移動駆動手段13による可動パネル2の起立駆動を停止させた後に動作を終了させる。ただし、ステップS11で動作開始後に所定の時間を経過していると判定されたときや、ステップS12で起立動作中の速が遅すぎると判定されたときは、ステップS22へと進み、何らかの障害により正常な動作が行えなくなっているものと判定して、可動パネル2の駆動制御をすべて停止する。

【0019】このように本実施例では、筐体1の収納口5から前進させた可動パネル2のシフトレバー検出手段

8が、予め記憶手段16にメモリされている最終前進位置の手前でシフトレバー3等の障害物を検知すると、前進動作を中断して起立動作に移行し、また、かかる起立動作中に可動パネル2のインパネ検出手段9が前面パネル装置P等の障害物を検知すると、起立動作を中断して前進動作に移行するようにしてあるので、シフトレバー3や前面パネル装置Pの大きさや形状が車種により異なっても、これらとの干渉を確実に回避しつつ可動パネル2を筐体1の前面側に所望の姿勢で配置させることができる。したがって、適用可能な車種が極めて多い汎用性を確保することができると共に、表示画面(モニタ画面)7の大型化にも対応させやすくなっている。

【0020】

【発明の効果】本発明は、以上説明したような形態で実施され、以下に記載されるような効果を奏する。

【0021】表示画面を有する液晶モニタ等の可動パネルに、前進方向の障害物の有無を検出する第1の検出手段と、起立方向の障害物の有無を検出する第2の検出手段とを設け、第1の検出手段が所定の検出信号を出力すると可動パネルの前進動作が中断されて起立動作に移行し、かつ、第2の検出手段が所定の検出信号を出力すると可動パネルの起立動作が中断されて前進動作に移行するようにしたので、複数回的前進動作と複数回の起立動作を交互に行わせることにより、シフトレバーの位置や大きさ、あるいは前面パネル装置の形状等が車種により異なっても、これらに干渉されない経路で可動パネルを前進・起立させて、この可動パネルを表示画面が見やすい所望の起立姿勢に配置させることができる。また、表\*

\* 示画面が大型化した場合にも、シフトレバーや前面パネル装置等に干渉されない経路で可動パネルを前進・起立させやすくなっている。

【図面の簡単な説明】

【図1】本発明の実施例に係る可動パネルの前進・起立動作を模式的に示す説明図である。

【図2】該可動パネルを駆動制御する駆動制御装置の概略構成を示すブロック図である。

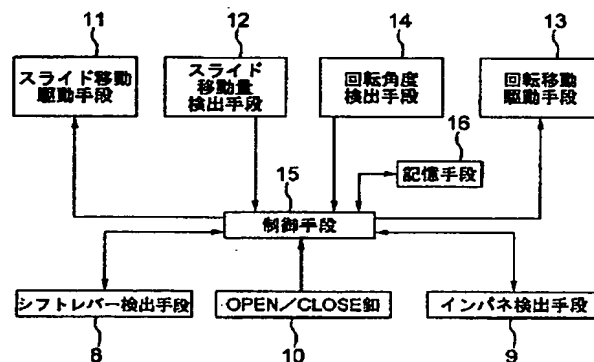
【図3】該可動パネルを前進・起立させる動作手順を示すフローチャートである。

【図4】該可動パネルの前進動作中断後の動作手順を示すフローチャートである。

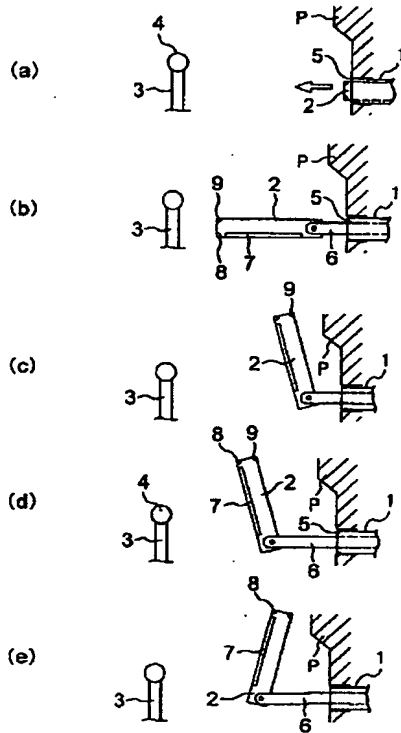
【符号の説明】

- P 前面パネル装置
- 1 筐体
- 2 可動パネル
- 3 シフトレバー
- 5 収納口
- 7 表示画面
- 8 シフトレバー検出手段(第1の検出手段)
- 9 インパネ検出手段(第2の検出手段)
- 11 スライド移動駆動手段
- 12 スライド移動量検出手段
- 13 回転移動駆動手段
- 14 回転角度検出手段
- 15 制御手段
- 16 記憶手段

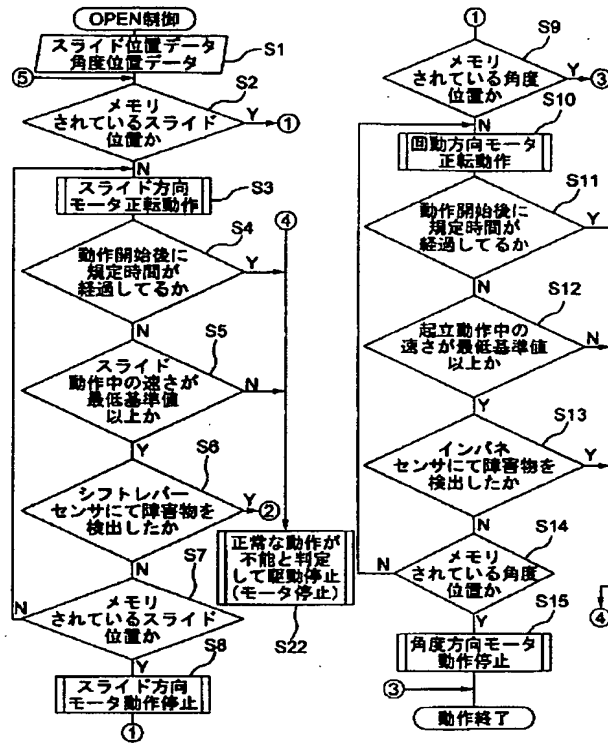
【図2】



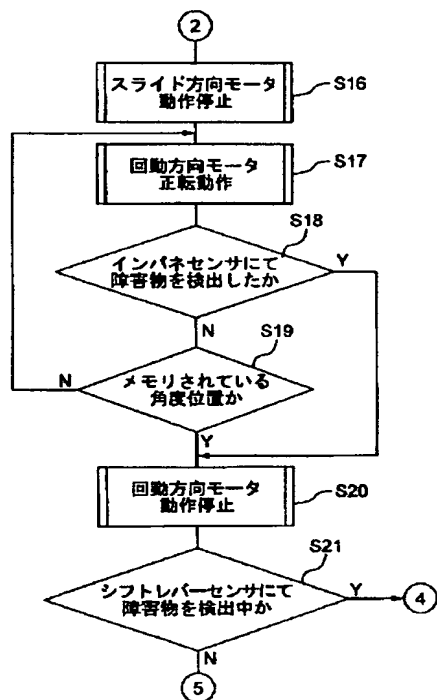
【図1】



【図3】



【図4】



フロントページの続き

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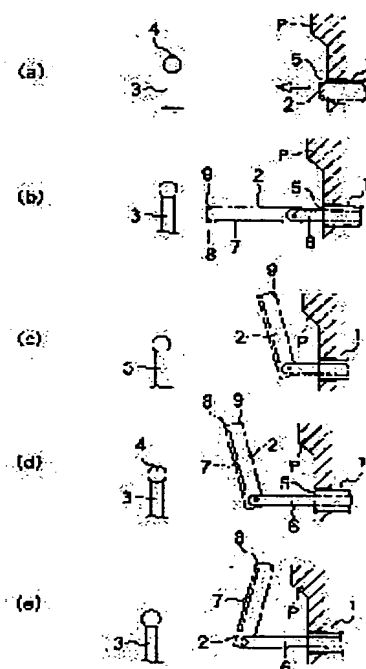
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## (54) DRIVE CONTROLLER FOR ON-VEHICLE MOVABLE PANEL

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a drive controller of an on-vehicle movable panel of high flexibility, capable of preventing the movable panel from being interfered with a shift lever, a front panel device or the like in the advancing motion and the standing motion regardless of positions and sizes of the shift lever, the shapes of the front panel device or the like different from each other corresponding to the kinds of vehicles.

**SOLUTION:** A first detecting means 8 for detecting the presence or absence of an obstacle in the advancing direction and a second detecting means for detecting the presence or absence of the obstacle in the standing direction are mounted on the movable panel 2 such as a liquid crystal monitor having a display image plane 8, the advancing motion of the movable panel 2 is interrupted to be transferred to the standing motion when a predetermined detection signal is outputted from the first detecting means 8, and the standing motion of the movable panel 2 is interrupted to be transferred to the advancing motion when a predetermined detection signal is outputted from the second detecting means 9.



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- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the electronic equipment for mount by which the removable panel which has the display screen can appear freely frequently to a case, and is attached in front-panel equipment (instrument panel), and relates advance actuation and standing-up actuation of a removable panel to the drive control unit of the controllable removable panel for mount especially.

[0002]

[Description of the Prior Art] Although the spread of the electronic equipment for mount equipped with the liquid crystal display monitor is remarkable in recent years, when a monitoring device is always installed in the anterior part of the vehicle interior of a room, there is a difficulty of narrowing a front field of view or being easy to become the obstacle of operation. Moreover, when the display screen for monitors is built into some front-panel equipments, in order to secure the tooth space which arranges various actuation keys, there is a difficulty that the display screen is not made greatly.

[0003] Then, in the AV equipment for mount etc., what made the liquid crystal display monitor the removable panel method which can appear freely frequently to front-panel equipment is spreading recently. Since a removable panel can be contained and set with a level posture into receipt opening of front-panel equipment when a passenger does not look at monitor display (display screen) if such a removable panel method is adopted For the occupancy area of the removable panel to the front-panel equipment with which various actuation keys are arranged not to become so large, and see monitor display By advancing a removable panel and carrying out specified quantity standing up from receipt opening of front-panel equipment, a passenger can arrange a removable panel in a legible location. In addition, a thing given in JP,7-9920,A is mentioned as a conventional technique which adopted this removable panel method.

[0004]

[Problem(s) to be Solved by the Invention] By the way, since it is usually arranged in many cases with the posture which stood up to slanting facing up between front-panel equipment and the shift lever beside a driver's seat, in case a removable panel is advanced from receipt opening of front-panel equipment or removable panels, such as a liquid crystal display monitor, are made to stand up after advance, it is necessary to consider them so that a shift lever may not be contacted, and they need to carry out drive control of the removable panel. It is becoming difficult to make it result in the legible standing-up posture of slanting facing up only by making it stand up, since the liquid crystal display monitor of a removable panel method is advanced to the location which does not contact a shift lever especially these days that the display screen of the liquid crystal display monitor for mount is enlarging. Therefore, the technique of making it stand up gradually is used for the thing given [ above-mentioned ] in JP,7-9920,A which the device which can perform advance actuation and standing-up actuation, without causing a shift lever and interference even if it is the

removable panel of a large area demanded, for example, was mentioned as a conventional technique, advancing a removable panel.

[0005] However, the location and the magnitude of a shift lever of an automobile changed with types of a car, and the design which made some front panel equipments project to a seat side recently had spread, and since there was also a possibility that the amount of this lobe may cause the removable panel under standing up actuation and interference, when uniquely opted for advance actuation and standing up actuation of a removable panel, there was a problem that where of the type of a car which can apply this removable panel will be restrict to un-want.

[0006] This invention was made in view of the technical problem of such a conventional technique, and it is in the purpose offering the drive control unit of the high removable panel for mount of versatility which can prevent that a removable panel interferes with a shift lever, front-panel equipment, etc. at the time of advance actuation and standing-up actuation, even if the location of a shift lever, the configuration of magnitude or front-panel equipment, etc. change with types of a car.

[0007]

[Means for Solving the Problem] This invention establishes the 1st detection means which detects the existence of the obstruction of the advance direction to a removable panel, and the 2nd detection means which detects the existence of the obstruction of the standing-up direction. It carries out to interrupting advance actuation of a removable panel, if the 1st detection means outputs a predetermined detecting signal, making it shift to standing-up actuation, and interrupting standing-up actuation of a removable panel, if the 2nd detection means outputs a predetermined detecting signal, and making it shift to advance actuation. Thus, even when advance actuation of multiple times and standing-up actuation of multiple times were made to perform to a removable panel by turns and the location of a shift lever, the configuration of magnitude or front-panel equipment, etc. change with types of a car, a removable panel can be made to be able to move forward and stand up in the path in which these do not interfere, and the display screen can arrange this removable panel into the standing-up posture of a legible request.

[0008]

[Embodiment of the Invention] In the drive control unit of the removable panel for mount by this invention By making it stand up, while having the front panel which has the display screen at least, the case which has receipt opening with which this removable panel can be absorbed, and the drive controlling mechanism which drives said removable panel and advancing said removable panel from said receipt opening In the drive control unit of the removable panel for mount which makes said display screen expose to the front-face side of said case The 1st detection means which detects the existence of the obstruction of the advance direction in said removable panel, and the 2nd detection means which detects the existence of the obstruction of the standing-up direction are established. If said 1st detection means outputs a predetermined detecting signal, advance actuation of said removable panel will be interrupted, it shifted to standing-up actuation, and when said 2nd detection means outputted the predetermined detecting signal, standing-up actuation of said removable panel is interrupted, and it was made to shift to advance actuation.

[0009] In the drive control unit of such a configuration, if the 1st detection means of the removable panel advanced from receipt opening of a case detects obstructions, such as a shift lever, before the advance location set up beforehand, since it will interrupt advance actuation and will shift to standing-up actuation, interference with this obstruction is avoidable. Moreover, if the 2nd detection means of a removable panel detects the obstructions for a lobe etc. of front-panel equipment during standing-up actuation, since standing-up actuation will be interrupted and it will shift to advance actuation, interference with this obstruction is avoidable. So, even if the configuration of the location of a shift lever, or magnitude or front-panel equipment etc. changes with types of a car by making advance actuation of multiple times, and standing-up actuation of multiple times perform by turns in this way, a removable panel can be made to be able to move forward and stand up in the path in which these do not interfere, and the display screen can arrange this removable panel into

the standing-up posture of a removable request. Moreover, by the same reason, also when a display screen is enlarged, it becomes that it is easy to make a removable panel move forward and stand up in the path in which neither a shift lever nor front-panel equipment interferes.

[0010]

[Example] When an example is explained with reference to a drawing, the explanatory view showing typically advance / standing-up actuation of the removable panel which drawing 1 requires for the example of this invention, the block diagram showing the outline configuration of the drive control device with which drawing 2 carries out drive control of this removable panel, the flow chart which shows the operations sequence to which drawing 3 makes this removable panel move forward and stand up, and drawing 4 are flow charts which show the operations sequence after advance working \*\* of this removable panel.

[0011] In drawing 1, the front-panel equipment with which an audio equipment etc. is attached in the front part of the vehicle interior of a room, and Sign P is also called an instrument panel for short, the case with which this front-panel equipment P is equipped with 1, the removable panel with which 2 consists of flat-surface displays, such as a liquid crystal display monitor which can appear freely frequently, to this case 1, the shift lever by which 3 was installed beside the driver's seat, and 4 are that shift knob. The removable panel 2 is formed in the receipt opening 5 which can be contained with a level posture by the case 1, by making a removable panel 2 \*\* by the slide migration driving means of slider 6 grade approximately, a removable panel 2 can be made to be able to discharge from the receipt opening 5, or a removable panel 2 can be conversely engrossed into the receipt opening 5. In addition, although illustration has not been carried out, the mechanical component of the rotation driving means on which a removable panel 2 can be made to be able to stand up to a case 1, or it can be made to concentrate is incorporated. Moreover, the display screen (monitor display) 7 of a removable panel 2 is a 7 inches screen a little large-sized as an object for mount. The shift-lever detection means 8 for detecting the forward cardiac failure theory object of shift-lever 3 grade and the instrument panel detection means 9 for detecting the obstruction of the standing-up direction of front-panel equipment 1 grade are formed in the head of this removable panel 2, and these detection means 8 and 9 are constituted by the sensor using reflection of a supersonic wave, infrared radiation, etc.

[0012] Advance actuation and standing-up actuation of a removable panel 2 are controlled by the drive control unit of a configuration as shown in the block diagram of drawing 2 R> 2. Namely, the shift-lever detection means 8 and the instrument panel detection means 9 which were mentioned above to this drive control device, The operating button 10 which is an input button which orders it discharge and receipt of a removable panel 2 (OPEN/CLOSE \*\*), The slide migration driving means 11 made to \*\* a removable panel 2 approximately and a slide movement magnitude detection means 12 to detect the advance location of a removable panel 2, The rotation driving means 13 which rotates a removable panel 2 (standing up and devotion), An angle-of-rotation detection means 14 to detect angle of rotation (standing-up include angle) of a removable panel 2, The control means 15 as which various detecting signals and a command signal are inputted and which outputs a control signal to driving means 11 and 13 based on these signals, and a storage means 16 by which the information about the advance location and the angular position of a removable panel 2 etc. is memorized both possess.

[0013] Next, operations sequence until it makes the removable panel 2 of a receipt condition move forward and stand up and arranges it into the posture of a request of a display screen 7 is explained along with drawing 3 and the flow chart of 4. If the OPEN control signal with which press actuation is carried out and an operating button 10 orders it discharge of a removable panel 2 now is outputted from a control means 15, the removable panel 2 contained with the posture level in the receipt opening 5 will be driven by the slide migration driving means 11, and as shown in drawing 1 (a), it will start advance actuation toward a shift lever 3. However, before starting advance actuation, in step S1, investigate the slide position data and angular-position data of a removable panel 2 first, and subsequently to step S2, it sets. It investigates whether it is the value (the last

advance location) by which memory of the slide position data is beforehand carried out to the storage means 16. If it becomes YES at step S2, it will progress to step S3, and actuation will be terminated, if angular-position data investigate whether it is the value (the last standing-up location) by which memory is beforehand carried out to the storage means 16 and become YES by step S9.

[0014] Since it is set to NO at step S2 when a removable panel 2 is in a receipt condition, it progresses to step S3, and a motor starts normal rotation actuation in order to advance a removable panel 2. And if the speed under slide actuation investigates whether it is beyond a floor value at step S5 and it is satisfactory at step S4 after investigating whether the convention time amount permitted after initiation of operation has passed, it will progress to step S6. However, when judged with having gone through time amount predetermined with step S4 to after initiation of operation, or when it is judged with the speed under slide actuation being too slow at step S5, it progresses to step S22, and it judges with the thing it is impossible to perform normal actuation according to a certain failure, and all drive control of a removable panel 2 is suspended. In addition, it sets up so that the speed under slide actuation may move more than 10mm (electrical-potential-difference value 0.2V) in 500ms as an approach of investigating whether it being beyond a floor value, in step S5, for example using a linear position sensor, if an electrical-potential-difference value is more than 0.2V and it is normality and less than [ 0.2V ], it can carry out by considering as an error, and it can judge whether slide actuation is checked on the way by this.

[0015] At step S6, it investigates whether the shift-lever detection means 8 detected the forward cardiac failure theory object of shift-lever 3 grade, if there is no obstruction ahead, it will progress to step S7, and it investigates whether it is the last advance location where memory of the advance location of a removable panel 2 is carried out beforehand. It progresses to step S9, after returned to step S3, having repeated the same procedure, progressing to step S8 if the judgment of having reached to the last advance location was made, and stopping the advance drive of the removable panel 2 by the slide migration driving means 11, if judged with having not reached to the last advance location yet in step S7. However, in the case of this example, as it cannot be made to move forward at a stretch from the receipt opening 5 to the last advance location but a removable panel 2 is shown in drawing 1 (b), when a removable panel 2 moves forward according to the physical relationship of a shift lever 3 and the display screen 7 to the location where the shift-lever detection means 8 considers that a shift lever 3 is an obstruction, the judgment of step S6 serves as YES, and it progresses to step S16 shown in drawing 4 R> 4.

[0016] After stopping the advance drive of the removable panel 2 by the slide migration driving means 11 at step S16 first in the flow chart of drawing 4 (advance actuation is interrupted), At step S17, rotate a removable panel 2 in the standing-up direction by the rotation driving means 13, and, subsequently to step S18, it sets. It investigates whether the instrument panel detection means 9 detected the standing-up direction obstructions, such as front-panel equipment P, if there is no obstruction in the standing-up direction, it will progress to step S19, and it investigates whether it is the last standing-up location where memory of the angular position of a removable panel 2 is carried out beforehand. If are judged with having not reached to the last standing-up location yet in step S19 and judgment of having returned to step S17, having repeated the same procedure, and having reached to the last standing-up location will be made After progressing to step S20, stopping the standing-up drive of the removable panel 2 by the rotation driving means 13 and checking that it progresses to step S21 and there is no obstruction ahead, it returns to step S2 shown in drawing 3, a removable panel 2 is advanced to the last advance location, and actuation is terminated.

[0017] As shown in drawing 1 (c), before a removable panel 2 arrives at the last standing-up location, on the other hand, the instrument panel detection means 9 wholly front-panel equipment 1 the bottom as an obstruction a case Since the judgment of step S18 was set to YES, after progressing to step S20, interrupting the standing-up drive of a removable panel 2 and checking that it progresses to step S21 and there is no obstruction ahead Return to step S2 shown in drawing 3, and advance actuation is made to resume, and as shown in drawing 1 (d), a removable panel 2 is advanced to the last advance location. However, although the shift-lever detection means 8 can

detect a front obstruction in the middle of the advance actuation made to resume in this way. In that case, progress to step S16 again from step S6, and a removable panel 2 is made to stand up. If it can be made to stand up to the last standing-up location in this 2nd standing-up actuation, it will progress to step S2 through step S21, and a removable panel 2 is advanced to the last advance location, and actuation is terminated. Moreover, in the middle of this 2nd standing-up actuation, as the case mentioned front-panel equipment P above the bottom wholly as the obstruction again, after the instrument panel detection means 9 interrupts the standing-up drive of a removable panel 2, it progresses to step S2 through step S21, and progresses to step S9 in the phase where the removable panel 2 was advanced to the last advance location. In addition, since there can be an obstruction and can move forward ahead although the removable panel 2 has not reached to the last advance location when the judgment of step S21 is YES, it judges with the thing it is impossible to perform normal actuation according to a certain failure, and all drive control of a removable panel 2 is suspended.

[0018] Now, when it moves forward up to the last advance location and progresses to step S9 although the removable panel 2 has not reached up to the last standing-up location as shown in drawing 1 (d), a motor starts normal rotation actuation in order to progress to step S10 and to make a removable panel 2 stand up, since a judgment there serves as NO. And after investigating whether the convention time amount permitted after initiation of operation at step S11 has passed, the speed under standing-up actuation investigates whether it is beyond a floor value at step S12, and if satisfactory, it will progress to step S13. In addition, the approach the speed under standing-up actuation investigates whether it is beyond a floor value in step S12 is the same as the approach in the step S5 mentioned above of investigating the propriety of the speed of slide actuation using a linear position sensor etc., and is good. In this way, if it progresses to step S13 from step S12, it investigates whether the instrument panel detection means 9 detected the obstruction of the standing-up directions, such as front-panel equipment P, and if there is no obstruction in the standing-up direction, it will progress to step S14, and will investigate whether it is the last standing-up location where memory of the angular position of a removable panel 2 is carried out beforehand. In step S14, if judged with the removable panel 2 having not reached to the last standing-up location yet, it will return to step S10 and the same procedure will be repeated. And since a judgment at step S14 serves as YES when a removable panel 2 reaches to the last standing-up location by standing-up drive as shown in drawing 1 R> 1 (e), it progresses to step S15, and actuation is terminated after stopping the standing-up drive of the removable panel 2 by the rotation driving means 13. However, when judged with having gone through time amount predetermined with step S11 to after initiation of operation, or when it is judged with the speed under standing-up actuation being too slow at step S12, it progresses to step S22, and it judges with the thing it is impossible to perform normal actuation according to a certain failure, and all drive control of a removable panel 2 is suspended.

[0019] Thus, if the shift-lever detection means 8 of the removable panel 2 advanced from the receipt opening 5 of a case 1 detects the obstruction of shift-lever 3 grade in this example before the last advance location by which memory is beforehand carried out to the storage means 16. If advance actuation is interrupted, and it shifts to standing-up actuation and the instrument panel detection means 9 of a removable panel 2 detects obstructions, such as front-panel equipment P, during this standing-up actuation, since standing-up actuation is interrupted and it has been made to shift to advance actuation. Even if the magnitude and the configuration of a shift lever 3 or front-panel equipment P change with types of a car, a removable panel 2 can be arranged with a desired posture to the front-face side of a case 1, avoiding interference with these certainly. Therefore, while versatility with very many applicable types of a car is securable, it has become that it is easy to make it correspond also to enlargement of the display screen (monitor display) 7.

[0020]

[Effect of the Invention] This invention is carried out with a gestalt which was explained above, and does so effectiveness which is indicated below.

[0021] The 1st detection means which detects the existence of the obstruction of the advance direction to removable panels, such as a liquid crystal display monitor which has the display screen, If the 2nd detection means which detects the existence of the obstruction of the standing-up direction is established and the 1st detection means outputs a predetermined detecting signal, advance actuation of a removable panel will be interrupted and it will shift to standing-up actuation. And since standing-up actuation of a removable panel is interrupted and it was made to shift to advance actuation when the 2nd detection means outputted the predetermined detecting signal By making advance actuation of multiple times, and standing-up actuation of multiple times perform by turns Even if the configuration of the location of a shift lever, or magnitude or front-panel equipment etc. changes with types of a car, a removable panel can be made to be able to move forward and stand up in the path in which these do not interfere, and the display screen can arrange this removable panel into the standing-up posture of a legible request. Moreover, also when a display screen is enlarged, it has become that it is easy to make a removable panel move forward and stand up in the path in which neither a shift lever nor front-panel equipment interferes.

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view showing typically advance / standing-up actuation of the removable panel concerning the example of this invention.

[Drawing 2] It is the block diagram showing the outline configuration of the drive control device which carries out drive control of this removable panel.

[Drawing 3] It is the flow chart which shows the operations sequence which makes this removable panel move forward and stand up.

[Drawing 4] It is the flow chart which shows the operations sequence after advance working \*\* of this removable panel.

[Description of Notations]

P Front-panel equipment

1 Case

2 Removable Panel

3 Shift Lever

5 Receipt Opening

7 Display Screen

8 Shift-Lever Detection Means (1st Detection Means)

9 Instrument Panel Detection Means (2nd Detection Means)

11 Slide Migration Driving Means

12 Slide Movement Magnitude Detection Means

13 Rotation Driving Means

14 Angle-of-Rotation Detection Means

15 Control Means

16 Storage Means

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**CLAIMS**

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[Claim(s)]

[Claim 1] By making it stand up, while having the front panel which has the display screen at least, the case which has receipt opening with which this removable panel can be absorbed, and the drive controlling mechanism which drives said removable panel and advancing said removable panel from said receipt opening In the drive control unit of the removable panel for mount which makes said display screen expose to the front-face side of said case The 1st detection means which detects the existence of the obstruction of the advance direction in said removable panel, and the 2nd detection means which detects the existence of the obstruction of the standing-up direction are established. If said 1st detection means outputs a predetermined detecting signal, advance actuation of said removable panel will be interrupted and it will shift to standing-up actuation. And the drive control unit of the removable panel for mount characterized by interrupting standing-up actuation of said removable panel, and shifting to advance actuation when said 2nd detection means outputted the predetermined detecting signal.

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